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**New or Little Known Pselaphid Beetles of the United States,
with Observations on Taxonomy and Evolution
of the Family Pselaphidae**

Orlando Park

Northwestern University

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In a recent study of cavernicolous pselaphid beetles of Alabama and Tennessee a new tribe, Speleobamini, was reported (Park, 1951). The tribe was known from a single species from one cave in northern Alabama. This remarkable insect possessed the trochanter-femur articulation of brachysceline Pselaphinae and the aedeagus of macrosceline Pselaphinae. That is, it has a combination of morphological features that unite these two divisions of Pselaphinae, as well as unique features of its own. Very shortly after the cave pselaphid paper appeared, E. D. Quirsfeld of Hillsdale, New Jersey, wrote to the author stating that he and the late Alan S. Nicolay had collected a species in western North Carolina and eastern Tennessee quite a few years ago that they had tried to associate with *Pselaphus* without success, and which he recognized as a speleobamine. Subsequently Mr. Quirsfeld sent his material to the author for study. The specimens were found to represent a new genus of Speleobamini, and this in turn, required certain changes in a recent tribal key (Park, 1951), as well as providing valuable data on the possible evolution of several tribes.

New material has accumulated also on a little known tribe in America, the Bythinini, and this has made possible a revision of the group.

Finally, these new data have provided a tentative appraisal of the intrafamily relationship of Speleobamini to Bythinini, Tychini, and Pselaphini.

TRIBE SPELEOBAMINI

Park, 1951

This tribe was erected to contain a remarkable cavernicole that united certain diagnostic characters of the brachysceline and macrosceline divisions of the subfamily Pselaphinae. As noted in the introduction above, since the description of the tribal type, *Speleobama vana* (Park, 1951, p. 53), a second genus has been discovered. These new data materially extend our knowledge of the tribe.

Speleobamini may be defined by the following combination of diagnostic features: (1) eyes wholly absent to vestigial in both sexes where known; (2) eleven-segmented subcontiguous to approximate antennae; (3) four-segmented maxillary palpi, the first segment short but distinct, second segment very elongate and apically enlarged, third segment very elongate and apically enlarged, fourth segment very elongate and apically enlarged to subfalciform, bearing a long apical cone; (4) vertexal foveae absent to vestigial in both sexes where known; (5) pronotum elongate oval with simple disc, antebasal foveae absent to shallow; (6) elytra with antebasal foveae absent to shallow, sutural stria entire, no discal stria, flank simple and unmodified; (7) metathoracic wings absent to vestigial; (8) five tergites, the first three with distinct lateral margins, the first tergite very elongate; (9) seven sternites in the male sex, first short and obscured by pubescence, second very elongate, sixth with distal margin medianly incised to contain the seventh or penial plate; six sternites in the female sex where known, first and second as noted for the male; (10) legs brachysceline, the femur obliquely articulated on trochanter so that femur and coxa are relatively close to each other; (11) tarsi three-segmented, first short, last two very long, the third segment bearing a single claw but no accessory or parungual seta; (12) prosternum elongate, not medianly longitudinally carinate; (13) mesosternum bisected by a strong median longitudinal carina; (14) prothoracic coxae contiguous in confluent cavities; (15) mesothoracic coxae subcontiguous in separate cavities; (16) metathoracic coxae contiguous; (17) aedeagus large, median lobe elongate, with a long style on each side that bears two distal setae, is free, and inserted on the ventral face of the basal capsule, e.g., typical of macrosceline tribes.

Key to the Genera

Eyes, vertexal foveae, pronotal foveae, elytral foveae wholly absent; distal segment of maxillary palpi densely tuberculate (Pl. 1, I;

4, A)

Speleobama Park, 1951.

Eyes present, vestigial, of 2 to 6 facets each; pronotum with a row of five shallow antebasal foveae; each elytron with two shallow foveae; distal segment of maxillary palpi subglabrous and non-tuberculate (Pl. 1, J; 4, B)

Prespelea new genus.

Prespelea new genus

Genotype: *Prespelea quirsfeldi* new species.

Speleobamini having the following combination of diagnostic characters: (1) eyes present but minute and vestigial, consisting of two to six coarse facets; (2) maxillary palpi with the fourth (distal) segment very elongate, distally inflated, subglabrous and non-tuberculate; (3) pronotum with an antebasal row of five free, glabrous, rather shallow foveoid impressions, of which the median is much the largest; (4) each elytron with two very rudimentary, antebasal foveoid impressions.

Prespelea quirsfeldi new species (Pl. 1, J; 2, E; 3, B; 4, B, C; 5, I) .

Type Male: Head 0.30 mm. long x 0.22 mm. wide; pronotum 0.37 x 0.27; elytra 0.47 x 0.62; abdomen 0.53 x 0.65; total length 1.7 mm.

Shining reddish brown; pubescence generally moderately long, sparse, coarse and golden; integuments subimpunctate, except more obvious on elytra where the setal bases are in clear punctules

Head elongate suboval; eyes minute, vestigial, far down on sides of head, consisting of six coarse facets near the lower margin of acetabulum of antenna; two vertexal foveae present but so minute and punctiform that they are just discernible (in a cleared slide mount, each foveal pit is seen to be attached to a supratentorial arm of the tentorium, as typical of the family; cf. Stickney, 1923, Park, 1942). The occiput and long cervicum are wholly obscured by the conspicuous ruff of golden setae so characteristic of the Speleobamini. This ruff is composed of long setae that arise from the occiput and extend over the cervicum, and arise from the cervicum and extend over the occiput (in a cleared slide, the cervicum is seen to be suddenly very narrow and pedunculate near the occiput, and the dorsal surface of this peduncle holds a deep oval fossa, the posterior end of which is elevated to form a cusp and can be seen sometimes on pinned specimens). Antennal rostrum with a triangular impression, the apex of which fits between the rounded contiguous antennal articulations; front vertical, consisting of a narrow ridge between the

large antennal acetabulae. Mandibles powerful, with four to five minute teeth on inner rami, and right mandible crossed dorsal to left mandible. Ventral surface of head glabrous and convex distal of the thick cervical ruff.

Maxillary palpi unique, as described under tribe and genus, and illustrated (Pl. 1, J) .

Antennae eleven-segmented, simple, almost one-half as long as body, approximately articulated in large, glabrous acetabulae on each distal corner of the rostrum; segment I elongate cylindrical; II as wide as first and two-thirds as long, slightly elongate; III to VIII subequally wide, slightly elongate, slightly narrower than second; weak club of last three segments, IX subquadrate and rounded hexagonal, X similar but slightly larger than ninth, XI almost as long as preceding three united, suboviform and bearing both normal aciculate setae and numerous antennal cones.

Pronotum elongate, disc simply convex; a transverse row of glabrous, free foveoid impressions near base, the median of which is the largest and separated from the adjacent impressions by carinoid plicae.

Elytra with no evident humeral angles; each elytron with two vestigial foveoid impressions, sutural stria entire, no discal stria or impression; flank deep and unmodified.

Abdomen with five tergites and seven sternites. Tergites in median length ratio of 6.0/1.5/1.1/2.0/1.5 with first three bearing narrow but distinct lateral margins; first tergite of exceptional length and deeply depressed at base, this depression filled with a dense mat of golden setae, contributed from both the apical elytral margins and from the tergite; last four tergites rapidly declivous. Sternites in a median length ratio of 0.5/4.0/0.1/0.1/0.4/1.0/1.5 with the first obscured by a dense, golden setose mat; sixth sternite deeply incised medianly to contain the seventh or penial plate; venter concave in lateral outline. Finally, the fifth tergite is rather deeply biconcave for the distal half, the two glabrous impressions medianly separated by a narrowly convex ridge.

Prosternum not bearing a median longitudinal carina but bearing an oblong mat of setae. Mesothoracic coxae appear to be in confluent coxal cavities on superficial examination, but are actually subcontiguous in narrowly separated cavities, the mesosternum extended by a long narrow process that meets a short process from metasternum. Metasternum erected into a large and conspicuous cuspid tubercle that is formed abruptly from the posterior margins of the mesocoxal cavities. Legs slender and unmodified except that the metathoracic trochanters have a reflected triangular tooth on ventral margin (Pl. 2, E) and the distal tarsomere of the metatarsi is rather suddenly smaller in distal third (Pl. 5, I) ,

Female: As for male with the following few exceptions: (1) eyes minute, vestigial, of two coarse facets; (2) venter convex in lateral outline, of only six sternites; (3) metasternum simply tumid, not tuberculate; (4) metathoracic trochanters simple, not toothed.

The aedeagus (Pl. 3, B) is large and typically speleobamine.

Described on five specimens. Three were collected by E. D. Quirsfeld, in whose honor this species is named; two were collected by the late Alan S. Nicolay, whose collection is deposited in the United States National Museum. The two Nicolay specimens were sent to the author through the courtesy of Dr. E. A. Chapin and Dr. R. E. Blackwelder.

These five specimens are distributed as follows: the type specimen at the U.S. National Museum; two paratypes in the Quirsfeld Collection; one paratype in the author's collection; one paratype dissected.

All five specimens were collected by E. D. Quirsfeld and the late Alan S. Nicolay by sifting deep leaf mold in thickets of rhododendrons. Type male (June 14, 1940), paratype male (June 12, 1940), paratype female (June 11, 1940), paratype female (June 15, 1940) in the Cataloochee Divide, near 5000 feet elevation, about thirty miles due west of Asheville, in Haywood County, North Carolina; one paratype female (September 15, 1941) at "The Chimneys," near Gatlinburg, Sevier County, Tennessee.

TRIBE BYTHININI

sense Raffray, 1890 (*pars*); Jeannel, 1949 *et seq.*

Tribe Bythinini was established by Raffray (1890, p. 83) and later combined with other genera in the tribe Tychini (Raffray, 1903, p. 490) . This position was followed generally until Jeannel (1949, p. 41-42) divided the tychines on morphological grounds into the Bythinini of Raffray, 1890 in part, the Tychini in a new sense, and the Tanypleurini.

The Tanypleurini, with three subtribes, have no known genera in the United States but are numerous in the Neotropical Region (Park, 1951). The Tychini have two genera in the United States (*Tychus* and *Cylindrarctus*). The Bythinini have four genera in the United States (*Bythinopsis*, *Pselaptrichus*, *Machaerites*, and *Machaerodes*).

North American tychines are readily distinguished from bythinines. The tychine genera have the third segment of the maxillary palpi relatively very long, almost as long, or as long as the fourth segment. Bythinine genera have the third segment of the maxillary palpi relatively short, always distinctly shorter than the fourth segment, and often minute.

The Bythinini have been expanded recently and need a brief discussion with respect to the known United States fauna.

Bythinini have the following combination of characters: (1) three-segmented tarsi, in which the first tarsomere is very short and the last two relatively very elongate; (2) tarsi usually bear a single tarsal claw, or in some species the tarsi bear a tarsal claw and a short accessory unguiform seta; (3) legs with brachysceline articulation (Pl. 2, F), with the femur placed extensively along the dorsal face of the trochanter, so that the femur and associated coxa are relatively close to each other; (4) relatively small mentum, not covering the mouth-parts, and maxillary cardo not extended obliquely distad; (5) abdomen with a lateral margin on each side of the first three visible tergites; (6) six sternites only in both sexes; (7) maxillary palpi large and conspicuous, first segment relatively well developed and visible, second and fourth segments very long, third segment short, fourth segment always bearing an apical palpal cone (the palpal cone is the fifth palpal segment of Jeannel) ; cf. Pl. 1, A-H; (8) metathoracic coxae distant (Pl. 2, F).

In this diagnosis of North American Bythinini, the fifth criterion distinguishes them from the neotropical Tanypleurini in which the abdomen has no margins, or the margins are formed by carinae; the seventh criterion distinguishes them from the Tychini, in the limited sense, in which the third palpal segment is very large and elongate.

The Bythinini furthermore occupy dark, moist habitats, such as deep leaf and log mold of forest floors, deep soil, and caves. There is a tendency for the eyes to be reduced in size and facet number or wholly absent; the wings may be vestigial or absent. Consequently, the members of the tribe are not too common in collections. Those species with reduced eyes, no eyes, vestigial wings, or no wings are not at light traps, and are seldom taken by sifting. The extracting of pselaphids from mold or soil by the Berlese method is relatively little employed, but is the best method for obtaining the non-cavernicolous species. The suggestion arises that the United States bythinine fauna is little known, and that many new species await discovery, especially in the southern Appalachians and the Ozarks.

In this interesting tribe, where eyes are present they tend to have a reduced facet number in the females; there is also a tendency in at least three genera for the males to have remarkably complicated gular areas (Pl. 2, A-C).

Key to Bythinini of the United States

- 1 Eyes wholly absent; metathoracic wings absent; known only from caves *Machaerites* (*Speleochnus*) 2
 Eyes well developed or vestigial, of only four or five facets, but present; wings well developed or vestigial; cavernicolous or not 5
- 2 (1) Head ovoidal in dorsal outline 3
 Head subtriangular in dorsal outline 4
- 3 (2) Metafemora swollen, metatibiae apically arcuate and bearing a spine distally male *Machaerites stygicus* Park (1951).
 Metafemora slender, metatibiae much less arcuate and distally not spined female *Machaerites stygicus* Park.
- 4 (3) Ventral surface of head bearing a complex gular shelf (Pl. 2, C) male *Machaerites ferus* Park (1951).
 Ventral surface of head simple, evenly convex female *Machaerites ferus* Park.
- 5 (1) Second and third palpal segments studded with small tubercles 7
 Second and third palpal segments subglabrous and not tuberculate *Machaerodes* 6
- 6 (5) Vertex bisected by a median longitudinal carina from cervicum to a point on a line between antennal articulations male *Machaerodes carinatus* (Brendel), 1865.
 Vertex with the bisecting carina extending to a point between the vertexal foveae female *Machaerodes carinatus* Brendel.
- 7 (5) Fourth palpal segment relatively broad, being about twice as long as wide *Pselaptrichus* (Pl. 1, A-C) 8
 Fourth palpal segment relatively narrow, always more than twice as long as wide *Bythinopsis* (Pl. 1, D-E) 12
- 8 (7) Ventral surface of head strongly tumid but otherwise uncomplicated 9
 Ventral surface of head complex, bearing paired spines, or median processes, or broad shelf-like ridges (Pl. 2, A, B) 11
- 9 (8) Prothoracic tibiae bearing a conspicuous spinoid projection (Pl. 2, D) male *Pselaptrichus tuberculipalpus* Brendel, 1889.
 Prothoracic tibiae not bearing this process 10

- 10 (9) Fourth palpal segment obviously tapered distally (Pl. 1, A); body relatively small, 1.5 - 1.7 mm. long
 female *Pselaptrichus tuberculipalpus* Brendel 1889.
 Fourth palpal segment subequally broad to near apex (Pl. 1, B)
 ; body much larger, 2.00 - 2.9 mm. long
 female *Pselaptrichus rothi* new species.
- 11 (8) Ventral surface of head with a broad, bifurcated tumulus near base, the bifurcations laminoid (Pl. 2, A)
 male *Pselaptrichus rothi* new species. Ventral surface of head with a high, linear, median carinoid process near base (Pl. 2, B)
 male *Pselaptrichus curiosus* new species.
- 12 (7) Pronotum with a distinct transverse antebasal sulcus that unites a distinct lateral fovea on each side; not known from caves 13
 Pronotum with the transverse antebasal sulcus so vestigial as to be hardly discernible; cavernicolous
Bythinopsis jonesi Park (1951).
- 13 (12) Pubescence coarse and sparse
Bythinopsis tychoides (Brendel), 1865.
 Pubescence fine, dense, about twice as abundant
Bythinopsis carolinae (Casey), 1897.

***Pselaptrichus rothi* new species** (Pl. 1, B; 2, A, F; 3, C).

Type Male: Head 0.42 mm. long x 0.42 mm. wide; pronotum 0.42 x 0.47; elytra 0.74 x 0.76; abdomen 1.00 x 0.74; total length 2.6 mm.

Shining reddish brown; pubescence rather long, coarse and sparse; integuments subimpunctate except for elytra which are covered with coarse, very shallow punctures, and for a few scattered punctures on the head.

Head with small eyes of about 14 facets, the eyes curiously formed, being dorsoventrally elongate triangular; tempora long and rounded, more than twice as long as eyes; cervicum and occiput bisected by a median longitudinal carina that extends almost to the vertexal foveae; two vertexal foveae between eyes, the foveae nude, small, surrounded by a broad foveal impression and connected to the conspicuous rostral concavity by oblique impressions; front steeply declivous beyond interantennal line, and narrow between large acetabulae; labrum large, with a subtruncate distal margin; mandibles powerful, with four or five teeth on the inner rami.

Ventral surface of head very complex as illustrated.

Maxillary palpi typical of genus, as illustrated, the fourth segment unusually broad distally, microgranulate, setose, with the apex deflected, briefly drawn out and bearing a palpal cone.

Antennae eleven-segmented, typical of genus, articulated approximately, at each side of end of rostrum; segment I arcuate cylindrical from above, as long as third to sixth segments united; II one-fourth as long and slightly narrower than first, slightly elongate; III to VIII subequal in width, third obconical, fourth to sixth subquadrate and rounded hexagonal; seventh and eighth slightly longer than sixth; a weak club of last three segments, IX transverse and slightly produced mesially; X transverse, with rather squared corners, slightly wider than ninth; XI about as long as preceding three, only slightly wider than tenth, subconical.

Pronotum rather rounded, with simple convex disc; on each side near base is an obliquely set, pubescent lateral fovea, these foveae, connected by a deeply biarcuate antebasal sulcus.

Elytra with oblique humeri; each elytron with two large, pubescent antebasal foveae, deep and entire sutural stria, a weak discal impression for basal fifth, flank with a deep, oval pubescent subhumeral fovea and an entire epipleural sulcus.

Abdomen with five tergites and six sternites. Tergites in median length ratio of 2.7/ 2.0/ 2.0/ 2.8/ 2.8, with no basal abdominal carinae on first, and first three bearing strong lateral margins. Sternites simple, the sixth being medianly concave.

Prosternum not medianly longitudinally carinate but convex; mesocoxae slightly separated by slender processes from mesosternum and metasternum; metacoxae distant as illustrated.

Prothoracic legs with ventral edge of trochanter and proximal half of ventral face of femur tuberculate; tibiae slender, distally arcuate, with the ventral face of this arcuate area excavated. Metathoracic tibiae each distally armed with a stout spine. Tarsi typical of tribe, with a strong tarsal claw and a short, stout accessory appendage.

Aedeagus complex, as illustrated.

Female. As for the male with the following exceptions: (1) eyes small, subcircular to subtriangular, of about eight facets; (2) ventral surface of head simply gibbous; (3) whereas the male venter is concave in profile with a sharply concave sixth sternite, the female venter is convex in profile with the sixth sternite broadly flattened; (4) prothoracic tibiae not distally arcuate or ventrally excavated; (5) metathoracic tibiae not distally spined.

Described on twenty-four specimens, collected by Vincent D. Roth, in whose honor this new species is named. Type and ten paratypes collected in McDonald Forest, eight miles north of Corvallis, Oregon on November 4, 1949; seven paratypes in moss in McDonald Forest on November 22, 1949; five paratypes in McDonald Forest on May 16, 1952; one paratype in moss from Cascadia, Oregon on September 5, 1948. Type and twelve paratypes deposited with Dr. Roth, Department of Entomology, Oregon State College; ten paratypes in the author's collection; one paratype dissected.

This large, distinctive bryocole is readily separated from its congeners. Male *tuberculipalpus* Brendel, the genotype, has a simple gular field and remarkably modified protibiae (Pl. 2, D.) From the following species, *rothi* is distinct on gular modifications in the male.

***Pselaphtrichus curiosus* new species** (Pl. 1, C; 2, B)

Type Male: Head 0.31 mm. long x 0.31 mm. wide; pronotum 0.33 x 0.35; elytra 0.56 x 0.64; abdomen 0.42 x 0.53; total length 1.62 mm.

Shining yellowish brown with sparse pubescence; the integuments subimpunctate.

Head with small, vestigial eyes. These eyes have five facets, triangularly arranged, e.g., three dorsal, two median, one ventral, and are furthermore peculiar in that they have no pigment. This suggests that if the condition is normal, the insect is blind or has a very indifferent vision. The tempora rounded, more than three times as long as eyes; two vestigial vertexal foveae between eyes, weakly connected to rostral impression; rostral impression microgranulate, narrower than in *rothi*; narrow frontoclypeus declivous between large acetabulae.

Ventral surface of head very complex as illustrated, the organization as complicated as in *rothi*, but very different from that species in character.

Maxillary palpi typical of genus, proportions of segments as illustrated.

Antennae eleven-segmented, typical of genus, articulated as noted for *rothi*; segment I arcuate cylindrical, much shorter than in *rothi* but equal to third to seventh segments united; II one-third as long as first; III to VIII subequal in width, third rounded obconical, fourth to eighth subquadrate and rounded hexagonal in shape; weak club of last three segments, IX slightly larger than eighth, transverse trapezoid; X larger than ninth, transverse trapezoid, XI as in *rothi*.

Pronotum as in *rothi*.

Elytra with oblique humeri; each elytron with two large pubescent antebasal foveae, entire sutural stria, discal impression deep and limited to basal sixth; the flank is notably different, there is neither a subhumeral fovea nor a eipleural sulcus, and instead a weak carinoid elevation that parallels the margin.

Abdomen with five tergites and six sternites. Tergites in median length ratio of 2.5/2.0/1.4/1.8/1.8 with no basal abdominal carinae on first, and first three with lateral margins. Sixth sternite simply flattened medianly.

Prosternum, mesocoxae, and metacoxal separation as noted for *rothi*. Modifications of legs as described for *rothi*.

Described on one male, the type, in the collection of the author. This unique specimen was collected by means of a Berlese funnel, from forest floor mold at 1000 feet elevation by Ken. Christiansen, on July 17, 1949 near Avery, Shoshone County. Idaho in the St. Joe National Forest. The specimen was given to me by Dr. W. L. Brown, Jr. of Harvard University, and I am greatly indebted to Dr. W. F. Barr, of Moscow, Idaho for aid in location of the collecting locality.

This remarkable species is easily discriminated from its congeners, even though it is known from the male sex only. The males of all three known species can be separated on secondary sex modifications: *tuberculipalpus* has a simple gular area and greatly modified anterior tibiae (Pl. 2, D); *rothi* and *curiosus* have differential eye facet number and eye size, and the modifications of the gular area are very different in these two species (Pl. 2, A, B).

With the description of three species, the genus *Pselaptrichus* is seen to be a western aggregate, probably little explored, and known so far from the Pacific Northwest (California, Oregon and Idaho) ; the populations appear to be adjusted to moderate altitudes, and to the moist, dim niches of forest floor litter and mosses.

Finally, the radical differences in elytral flank suggest at least sub-generic separation: Subgenus *Pselaptrichus*, *sensu* Brendel, 1889. containing the genotype *tuberculipalpus* Brendel, and *rothi* new species, in which the elytral flank bears a distinctive subhumeral fovea and longitudinal sulcus; and Subgenus *Vestitrichus* new subgenus, containing the subgenus type *curiosus* new species, in which the elytral flank lacks both sub-humeral fovea and longitudinal sulcus.

CHECKLIST OF KNOWN UNITED STATES BYTHININI

Bythinopsis

Raffray, 1908, p. 282

***B. carolinae* (Casey)** 1897, p. 614 (*Bythinus*). Asheville, Buncombe County, North Carolina.

***B. jonesi* Park**, 1951, p. 43. Wolf Den Cave, Maud, Colbert County, Alabama.

***B. tychoides* (Brendel)**, 1865, p. 259 (*Tychus*). Pennsylvania; Ohio; Upper Montclair, Essex County, New Jersey; Wyandanch, Suffolk County, Long Island, New York. Redescription: *Machaerodes tychoides* (*Tychus bythionoides*) Brendel, 1890, p. 253. *Bythinopsis bythinoides* Bowman, 1934, p. 117.

Machaerites

Miller, 1885; Jeannel, 1950, p. 170 sensu novo

Subgenus ***Speleochus* Park, 1951, p. 45.**

***M. (S.) ferus* Park**, 1951, p. 49. Aladdin Cave, Sharp's Cove, Hutton Cave, Sharp's Cove, Madison County; Devil Stair Step Cave, Keel Sinks, Hambrick Cave, Hambrick Sinks, Jackson County, Alabama. Aladdin Cave is the type locality.

***M. (S.) stygicus* Park**, 1951, p. 47. Barclay Cave, King Mountain; Cave Spring Cave, Certain Gap; Toll Gate Natural Well, Monte Sano; Huntsville Spring Cave, Huntsville; Kelly Natural Well, King Mountain; Lott Cave, Big Cove; Twin Cave, Brownsboro, Madison County, Alabama. Toll Gate Natural Well is the type locality. Type of subgenus.

Machaerodes

Brendel, 1890, p. 252

***M. carinatus* (Brendel)**, 1865, p. 29 (*Bythinus*), Allegheny Mountains (Alleghany Mountains); Canada; Virginia. My series is from Warm Springs, Bath County, Virginia; Black Mountains, North Carolina; Hamrick, Yancey County, North Carolina. The Canadian record may refer to an undescribed species. Brendel refers to *Bythinus* (*Machaerodes*) *carinatus* 1889, p. 195. Genotype.

Pselaptrichus

Brendel, 1889, p. 194

Subgenus *Pselaptrichus sensu strictiore*

P. (P.) rothi new species (see p. 256). McDonald Forest, Corvallis, Benton County, Oregon (type locality) ; Cascadia, Linn County, Oregon.

P. (P.) tuberculipalpus **Brendel**, 1889, p. 194. Alameda County, California (type locality). My series comes **from** Santa Cruz Mountains, California and Sonoma County, California. Genotype.

Subgenus *Vestitrichus* new subgenus

P. (V.) curiosus new species (p. 258). Avery, Shoshone County, Idaho in the St. Joe National Forest. Type of subgenus.

TRIBE VALDIINI new tribe

Pselaphidae having the following combination of diagnostic features: (1) body with normal, monaxon, aciculate setae; (2) eyes present and prominent; (3) a pair of large vertexal foveae, each fovea bearing a tuft of long and erect setae; (4) eleven-segmented antennae approximately articulated on a broad frontal tubercle; (5) maxillary palpi four-segmented, first segment minute; second long, flattened and contorted; third small and triangular; fourth large, oval, covered with erect and capitulate setae; (6) abdomen with well defined lateral margins; (7) five tergites in both sexes; (8) six sternites in the female; seven sternites in the male, the seventh in the form of a minute penial plate; (9) brachysceline trochanter-femoral articulation; (10) mesocoxae narrowly separated; (11) metacoxae narrowly separated; (12) three-segmented tarsi, with first segment very small and last two relatively long, the third segment bearing a pair of long, slender, unequal tarsal claws.

This new tribe is erected for *Valda* Casey, 1893, p. 493. So far, but one species has been described: the genotype, *Valda frontalis* Casey, 1893, p. 493, from Siskiyou County, California.

Valda has occupied an anomalous position since its description. Originally Casey placed it in the Bythinini (*sensu* Raffray, 1890). Subsequently it was placed in Tychini (*sensu* Raffray, 1903) by Leng (1920) and Bowman (1934), but because of its tarsal claws it was out of place with other tyichines. After Jeannel (1949) reorganized the Tychini, it became obvious that *Valda* was best placed in a separate tribe, Valdiini, in the section Bythinomorphi (Jeannel, 1949, p. 41). Certain of its affinities are set forth in Table I.

From a study of the features in Table I, as well as other aspects of anatomy, Valdiini are distinct. The combination of lateral margins,

two tarsal claws, approximate metacoxae, and a short third palpal segment serves to distinguish them from their allies.

Table 1. Comparison of Valdiini with Certain American Allies.

Character	Valdiini	Bythinini	Tychini	Tanypleurini
Distribution	Nearctic	Nearctic	Nearctic	Neotropical
Lateral abdominal margins	Present	Present	Present	Absent
Maxillary palpal segment II	Elongate	Elongate	Elongate	Elongate
Maxillary palpal segment III	Short	Short	Elongate	Short
Antennae	Approximate	Approximate	Approximate	Distant
Sternite number	7♂ 6♀	6♂ 6♀	7♂ 6♀	7♂ 6♀ or 6♂ 6♀
Metacoxae	Approximate	Distant	Distant	Distant or Approximate
Tarsal claw (s) (accessory seta not included)	Two, elongate slender	One	One	One

TRIBE TYRINI

Raffray, 1890; reorganized by Jeannel, 1949, 1950 and Park, 1951

Mipselyrus new genus

Genotype: *Mipselyrus nicolayi* new species.

Tyrini having the following combination of diagnostic characters: (1) eyes present, but minute and vestigial, of two coarse facets; (2) four-segmented maxillary palpi, of which the first is minute, the next three elongate and distally swollen; (3) eleven-segmented antennae, subcontiguously articulated beneath a prominent, sharply defined common antennal tubercle; (4) epicranium with three foveae, a pair of vertexal, and a median frontal; (5) pronotum with medianly tumid disc, and three free antebasal foveae; (6) elytron bifoveate, without discal impres-

sion and with entire sutural stria, and with unmodified elytral flank; (7) five tergites in both sexes; (8) six sternites in the female, and seven sternites in the male, the seventh a minute penial plate; (9) prosternum uncarinated medianly; mesosternum flattened and uncarinated; metasternum deeply concave in both sexes; (10) mesothoracic coxal- cavities separated narrowly by meso- and metasternal processes; (11) metathoracic coxae distant; (12) legs macrosceline; (13) tyrine tarsi bearing a pair of large, subequal tarsal claws; (14) aedeagus typically macrosceline, with well-developed lateral styles that arise from the ventral face of the median lobe.

***Mipseltyrus nicolayi* new species** (Pl. 4, D; Pl. 5, A, B, C, D).

Type Male. Head 0.37 mm. long x 0.29 mm. wide; pronotum 0.33 x 0.42; elytra 0.47 x 0.67; abdomen 0.48 x 0.69; total length 1.7 mm.

Shining reddish brown; pubescence sparse, straight-shafted and semiappressed on legs, but thin, semierect and tending to curl distally on body; integuments shining and subglabrous on body but granulatecribrate on legs.

Head with a minute, vestigial eye of two coarse facets on each side; tempora long and arcuate; three deep, nude, subequal foveae present, *viz.*, a pair of vertexal foveae on a line posteriad of "eyes," and, distally, a median frontal fovea, these three forming the angles of an equilateral triangle; front vertical, reduced to a thin lamina between the large antennal acetabulae; clypeus short and flat; labrum short and very transverse; mandibles strong, very arcuate, left crossed dorsal to right; ventral surface of head flattened, bearing a large, median spongiöse gular fovea and a spongiöse area at each posterior lateral angle; cervicum large and simple.

Maxillary palpi four-segmented; first segment minute and glabrous; second segment elongate, arcuate, distally swollen; third shorter than second, but elongate and swollen for distal three-fourths; fourth similar to second in size and shape, except for distal area of dorsomesial face; this distal area obliquely flattened, the flattened area bearing a series of outwardly arcuate setae, and within this setose area is the palpal cone; palpal cone is blunt, arcuate, and has a distinctive basal collar.

Antennae eleven-segmented, heavy-bodied, subgranulate; subcontiguously articulated beneath a very prominent and sharply defined antennal tubercle; segment I subquadrate from above; II subquadrate, smaller than first; III-VIII subequally wide, third subquadrate. fourth to eighth slightly transverse, club of last three segments, IX relatively very small, transverse and slightly wider than eighth, X large, transverse trapezoidal, XI as wide as tenth and almost twice longer, blunted oviform.

Pronotum longitudinally tumid medianly, so that in certain lights it appears medianly subcarinoid; three small, nude, free antebasal foveae.

Elytra with long oblique humeral angles; each elytron with two deep, subpubescent antebasal foveae; sutural stria deep and entire; no trace of discal stria or impression; flank simple, without trace of sub-humeral fovea or sulcus; the sutural elytral margins are closely appressed and meet obliquely in a ridge, this ridge continues around the antebasal foveae.

Abdomen with five tergites and seven sternites visible. Tergites in median length ratio of 4.0/2.0/2.0/2.8/1.7 with the last two invisible from above and the last actually ventral in position; lateral margins strong on first three tergites; base of first transversely impressed, this impression full of dense, spongiouse pubescence. Seven sternites in median length ratio of 1.0/3.0/0.7/0.5/0.5/1.0/0.4 with the venter very strongly concave in profile; first sternite hardly visible as a consequence of its dense, spongiouse pubescence; seventh sternite petite, transversely oval and not easily seen.

Prosternum short, not medianly longitudinally carinate, and obscured by spongiouse pubescence; mesosternum flattened, bearing a very large, spongiouse fovea (fovea No. 3) at base; metasternum sharply incised between metacoxae, and deeply concave medianly, the lateral margins of concavity carinoid.

Mesothoracic coxal cavities not confluent, but narrowly separated by processes of the mesa- and metasterna; metathoracic coxae moderately distant. Legs macrosceline, but less so than in many tyrine genera; heavily sculptured as noted previously; protrochanters each with a tooth at center of ventral face; mesotrochanters with a dentoid process at mesial angle of ventral face; tarsi long, three-segmented, first segment very short, second and third segments long, a pair of large, subequal tarsal claws.

Female as for male except that (1) the fifth (terminal) tergite is vertical rather than ventral; (2) the venter is convex in profile; (3) only six sternites, in median length ratio of 1.0/3.0/0.5/0.4/0.3/0.6; (4) protrochanters and mesotrochanters simple and unarmed.

In the fragment of the species population before me, certain other aspects should be mentioned. In some of the specimens, the setae of the antennal club are covered with what appears to be a dried, flaky, white secretion, as though certain of the setae were chemoreceptors. The antennal acetabulae are so narrowly separated that the median wall is in the form of a thin, translucent window, as in *Cylindrarctus*. The elytra are apparently connate, and separated with great difficulty, and the metathoracic wings are absent, being represented by a minute tumulus.

The aedeagus is typically macrosceline, as illustrated, with well-developed lateral styles that arise on the ventromedian face of the median lobe.

Described on sixteen specimens. These were collected by the late Alan S. Nicolay, in whose honor this species is named, and E. D. Quirsfeld, at "The Chimneys," near Gatlinburg, Sevier County, Tennessee (type locality, fourteen specimens) , and at the Cataloochee Divide, about thirty miles due west of Asheville, in Haywood County, North Carolina (two specimens) . The type and four paratypes deposited in the United States National Museum; four paratypes in the E. D. Quirsfeld collection; seven paratypes (two dissected) in the author's collection.

These sixteen specimens were taken by sifting deep leaf mold in rhododendron thickets in June, 1940 and September, 1941.

This is a very interesting addition to the fauna of the United States. At first glance, the general form and long maxillary palpi give the impression of a heavily-bodied *Pselaphus*; this is quickly belied by the elongate third palpal segment and the two subequal tarsal claws. The species is obviously another in the growing list of cryptozoic soil-litter pselaphids of the southern Appalachians. The vestigial, two-faceted eyes and absence of metathoracic wings suggest such a way of life. If true tyrine cavernicoles are to be found, it will not be surprising if they are allies of this genus.

It is of interest to note that both *Mipseltyrus* and the speleobamine *Prespelea* were obtained in the same habitat niches. In a personal communication from Mr. Quirsfeld, he states that both series of specimens when collected were extremely sluggish when brought out to light, and that they appeared to be adjusted to the darkness of deep soil habitats.

Finally, mention should be made of the pubescence. As noted previously, the general body pubescence consists in large part of thin-shafted, semierect setae that tend to curl distally. This curly mat of setae gives an odd appearance to the species, and is strikingly similar to the pubescence of the tyrine *Tyrogatanus zeteki* Park from termite galleries in Panamanian rain forest (Park, 1942, pl. 3, fig. 6) .

OBSERVATIONS ON TAXONOMY AND EVOLUTION

The subfamily Pselaphinae comprises about 90 per cent of the described Pselaphidae. This subfamily is divisible into the division Brachyscelia and the division Macroscelia. These two divisions were erected by Raffray (1890) , and have been subscribed to by all students of the family. The Brachyscelia have the trochanters bearing the femora obliquely along their dorsal margins, so that each femur and associated coxa are near to each other (Pl. 2, E. F; 5, G, H) . The Macroscelia

have the trochanters more elongate, often more or less clubbed, and especially the mesa- and metathoracic trochanters bear the femora at their distal faces, so that each femur and associated coxa are relatively distant from each other (Pl. 2, G; 5, E, F).

This basic separation of the Pselaphinae into two divisions involves approximately 4,500 species, and consequently should be understood in order to fully appreciate certain aspects of the following discussion. With the mesothoracic leg fully visible, so that the posterior face of the trochanter is in flat focus, it will be seen that the proximal face of the femur covers a certain amount of the dorsal face of the trochanter (Pl. 5, E-H). The amount of this coverage may vary as between tribes or genera or species, but it will be seen that the Brachyscelia have a relatively great amount of the trochantal length covered by the femur, e.g. 57 per cent or more (Pl. 5, G, H); whereas the Macroscelia have a relatively small amount of the trochantal length covered by the femur, e.g. 28 per cent or less (Pl. 5, E, F).

The metathoracic legs also show the same general relationship as between brachysceline and macrosceline tribes, but the metatrochanters tend to be less clubbed in Macroscelia (Pl. 2, G).

Jeannel (1949, 1950) associated important aedeageal characters with these two divisions. He finds that the Brachyscelia have the aedeagus either with no free lateral styles, or if styles are present they are generally inserted on or near the distal border of the median lobe. On the other hand, the Macroscelia have the aedeagus generally with a long, free style on each side, these two styles inserted on the ventral face of the median lobe. The brachysceline type (Pl. 3, C, D) and macrosceline type (Pl. 3, A, B) are naturally subject to tremendous variation within the divisions, tribes, subtribes, genera, subgenera and species but the two basic types are generally distinctive (cf. Park, 1942, pl. 1-3; 1949, pl. 8; 1951, fig. 1-4, 6-9, 12, 14, 15; 1952, p1. 1-3; Jeannel, 1949a, b; 1950a; 1951b all with numerous illustrations of aedeagi).

The Speleobamini would appear to be intermediate between these two great divisions. That is, they have the leg articulation of the Brachyscelia; the aedeagus of the Macroscelia. This suggests that the speleobamine tribe is very ancient, that it arose before the two divisions of Pselaphinae had appeared, and remains today as a relict stock, confined to deep forest mold, and caverns.

The author (1951, p. 80) found that the cavernicolous pselaphids of Alabama and Tennessee had their closest contemporary allies either within the hypogean fauna, or in the epigeal fauna of the southern Appalachians. At the time, this suggestion could not be checked for the

Speleobamini, known only from the cavernicole, *Speleobama vana*. In fact, it was assumed that there was little likelihood of the existence of epigean speleobamines.

The finding of the epigean *Prespelea quirsfeldi* has suggested that other speleobamine genera may exist, and they should be sought in the Appalachians between northern Georgia, Tennessee, Kentucky, Virginia, West Virginia and North Carolina. The Ozarks of Arkansas and Missouri, as well as southern Europe, may contain representatives of this strange tribe, both in caves and forest soil.

The range of *Prespelea quirsfeldi* is known to be through western North Carolina into eastern Tennessee, and supports the view of the faunal relationship just stated between southern Appalachian stocks and cavernicoles of Alabama and Tennessee. It is not tenable to view *Prespelea* as having evolved from *Speleobama*; on the other hand, *Prespelea* may have given rise to *Speleobama*, or, more probably, some ancestral speleobamine genus has provided an evolutionary center for both stocks.

It is difficult to assay the relationship of Speleobamini to contemporary pselaphids. Nor does the palaeontological information available offer much assistance. The most that can be said is that Schaufuss (1890) has described, among other species, a *Bythinus caviceps*, *B. foveopunctatus*, *B. tenuipes*, and *B. typicus* and *Tychus avus* and *T. radians* from Baltic amber of Oligocene age. If these genera are actually congeneric with modern *Bythinus* and *Tychus*, they represent the closest fossil allies to Speleobamini, but these are certainly very distantly related. A reading of Schaufuss' paper establishes the fact that both brachysceline and macrosceline divisions of Pselaphinae were flourishing by the Oligocene. This suggests that the separation of these two divisions occurred much earlier, in a pre-Oligocene time. Jeannel (1951a, p. 5) is of the opinion that the tribe Pselaphini is very old. He thinks that this tribe goes back to Jurassic times. The Speleobamini must antedate the Pselaphini since they have brachysceline femora, e.g., the mesothoracic femora cover 63 per cent of the metatrochantal length (Pl. 4, C) in *Prespelea*, and 75 per cent in *Speleobama*. Lack of adequate fossil material renders speculative any palaeontological age for the origin of speleobamine genera.

Speculative also is the palaeontological age of the Pselaphidae. If it assumed that the pselaphids arose from the Staphylinidae, or from an ancestral stock that provided both contemporary staphylinid and pselaphid families, then the existing pselaphids that most closely resemble staphylinids in their general anatomy would be thought of as the most primitive pselaphid group. The Mayetini are staphylinoid: in fact, were placed in the Staphylinidae until recently (Park, 1947), but too little is known concerning this tribe as yet to do more than suggest the accumulation

of additional data. For example, with the exception of a few European species (Bernhauer, Schubert and Scheerpeltz, 1910) little is known. Mayetini are unreported from the Western Hemisphere, but are known to occur in the litter or soil from southern Illinois and North Carolina.

The Faronini are relatively well known and have been studied much more by students of the family. The tribe is more staphylinoid than other contemporary tribes, with the possible exception of Mayetini noted previously, and their primitive anatomy has been commented upon by Casey (1893, p. 433), Jeannel (1950, p. 42-57), Raffray (1908, p. 13), Bowman (1934, p. 3) and Park (1942, p. 35).

The distribution of the Faronini (*sensu* Jeannel, 1950) is of especial interest in view of their relatively primitive anatomy. Park (1947, p. 124) lists 184 species. Since then, Jeannel has reorganized the tribe Faronini (1949, 1950, 1951 b). As a result of the changes made the present total is 194 species. These latter are distributed in the several zoögeographic regions as follows: Palaearctic 16, Ethiopian 11, Oriental 2, Australian 151, Nearctic 10, and Neotropical 4. From this it will be seen that the Australian Region, the home of so many primitive stocks of plants and animals, contains some 77 per cent of the total.

The suggestions that the Faronini are a very primitive tribe of the Pselaphidae, if not the most primitive tribe, then, come from (a) their external anatomy as compared with that of the Staphylinidae, and (b) their contemporary distribution. The Faronini are much more primitive than the Pselaphini, which Jeannel believes arose in the Jurassic. The Speleobamini, serving to bridge the gap between the two divisions of the subfamily Pselaphinae, must, then, be intermediate in age between the Faronini and Pselaphini. All of this suggests that the Pselaphidae, as a family, may have arisen prior to the Jurassic. At present this is speculative since no fossil data are available to assist in the solution, and the family might have arisen at a much later period, e.g., Cretaceous or Eocene.

Certainly the Speleobamini are uncommon and ancient. Turning to contemporary North American stocks, direct comparisons of external anatomy can be made. The three most similar tribes are contrasted with the Speleobamini in Table II.

In Table II ten important features are contrasted, and all four tribes have three features in common, *viz.*, elongate second and fourth palpal segments, and slightly separated mesothoracic coxal cavities. In addition, Speleobamini are allied to Bythinini in one character, to Pselaphini in two characters, and to Tychini in three characters. The Speleobamini also have two unique features in the tabular comparison, *viz.*, the conspicuous cervical ruff, and contiguous metathoracic coxae.

The last two features in the table are regarded as very basic. Here Speleobamini resemble Bythinini and Tychini in having brachysceline leg articulation, but resemble Pselaphini in having a macrosceline aedeagus. That is, Speleobamini span the gap between the Brachyscelia and Macroscelia.

Table 2. Comparison of Speleobamini with Certain American Allies.

Character	Bythinini	Tychini	Speleobamini	Pselaphini
Maxillary palpal segment II	elongate	elongate	elongate	elongate
Maxillary palpal segment III	short	elongate	elongate	short
Maxillary palpal segment IV	elongate	elongate	elongate	elongate
Conspicuous occipito-cervical ruff of long setae	absent	absent	present	absent*
First tergite and second sternite very long (about as long as other segments united)	no	no	yes	yes
Sternite number	6♂ 6♀	7♂ 6♀	7♂ 6♀	6♂ 6♀
Mesocoxal cavities	separated	separated	separated	separated
Metacoxae	distant	distant	contiguous	distant
Leg articulation: brachysceline or macrosceline	brachy.	brachy.	brachy.	macro.
Aedeagus: brachysceline or macrosceline	brachy.	brachy.	macro.	macro.

*Condition approached in dense, flattened mat of "glandular" pubescence on ventral cervical area of *Pselaphus*, and on both dorsal and ventral cervical areas of the neotropical *Neopselaphus*.

Finally, the contiguous metacoxae suggest a more primitive organization for Speleobamini than for the other three tribes. In explanation of the use of the word "primitive," the author considers the Pselaphidae as being derived from the Staphylinidae, or at least that these two families

arose from a brachyelytrous stock. The great majority of the enormous family Staphylinidae have contiguous to subcontiguous metacoxae (LeConte and Horn, 1883, p. 89; Bradley, 1930, p. 62), exceptions being the Steninae and Micropeplinae. In this feature, therefore, Speleobamini would seem to approach Staphylinidae.*

ABSTRACT

The tribe Bythinini is diagnosed; genera, subgenera, and species, of the United States are keyed out, and a checklist of the tribe given. Two new species of *Pselaptrichus* are described: subgenus *Pselaptrichus*, *rothi* from Oregon; new subgenus *Vestitrichus*, *curiosus*, type of subgenus, from Idaho.

The tribe Valdiini, new tribe, is diagnosed and erected for *Valda frontalis* Casey. This tribe is contrasted with its allies.

In the tribe Tyrini, *Mipseltyrus* new genus is erected, with *nicolayi* new species as genotype. This is a soil-inhabiting species with vestigial eyes and wings, from western North Carolina and eastern Tennessee.

As a result of new data, the tribe Speleobamini is revised to include a new genus, *Prespelea*, with *quirsfeldi* as genotype. This is a soil-inhabiting species with vestigial eyes and wings, from western North Carolina and eastern Tennessee.

The tribe Speleobamini is contrasted with allied tribes and its position in the classification is discussed. This tribe is thought of as palaeontologically older than Pselaphini, since the known genera have brachysceline femoral articulations and macrosceline aedeagi.

*Contiguous and subcontiguous metacoxae are found in other tribes of pselaphids, but these latter are not under discussion.

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PLATES 1 - 5

PLATE 1

Right Maxillary Palpi, ventral surface, X 70

A. Pselaptrichus tuberculipalpus Brendel.

B. P. rothi new species.

C. P. curiosus new species.

D. Bythinopsis tychoides (Brendel).

E. B. jonesi Park.

F. Machaerodes carinatus Brendel.

G. M (Speleochus) stygius Park.

H. M (Speleochus) ferus Park.

I. Speleobama vana Park.

J. Prespelea quirsfeldi new genus and new species.

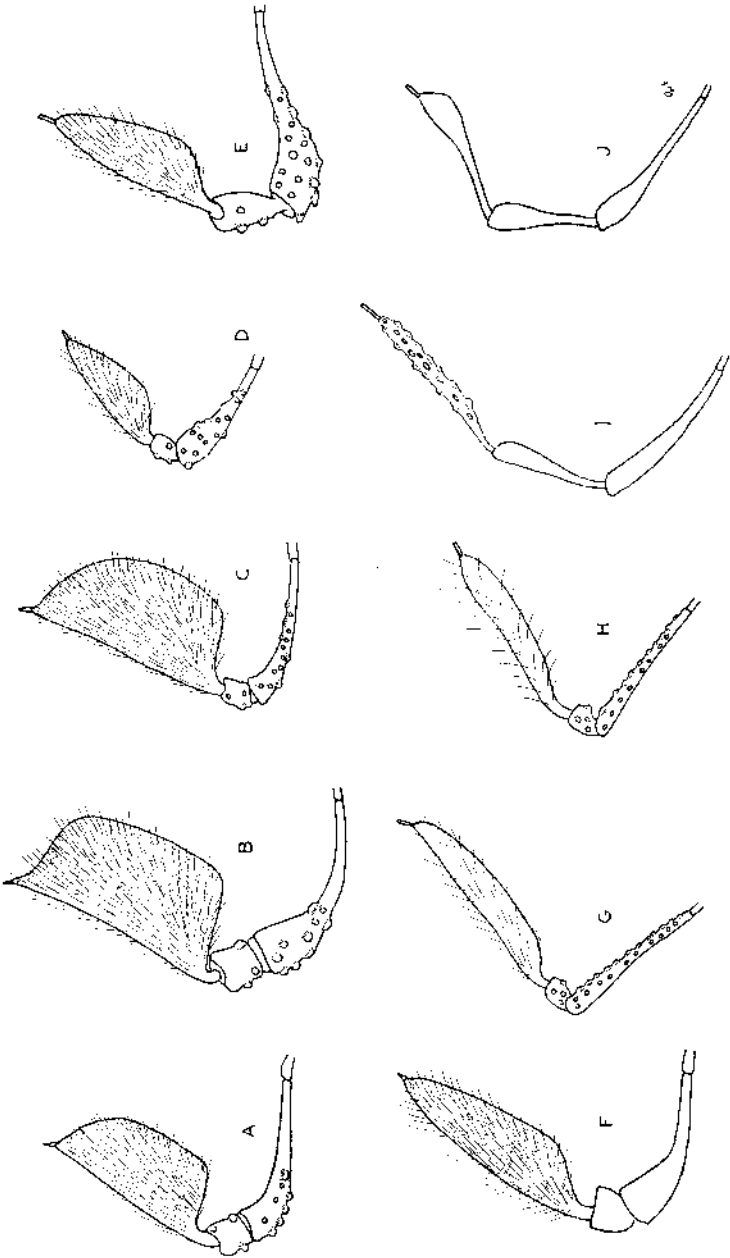


PLATE 2

- A. *Pselaptrichus rothi* new species, ventral view of head of male, X 70.
- B. *P. curiosus* new species, ventral view of head of male, x 70.
- C. *Machaerites (Speleochnus) ferus* Park, ventral view of head of male, X 70 (after Park, 1951).
- D. *Pselaptrichus tuberculipalpus* Brendel, male prothoracic tibia, x 70.
- E. *Prespelea quirsfeldi* new genus and new species, brachysceline articulation of metathoracic trochanter and femur, x 30.
- F. *Pselaptrichus rothi* new species, brachysceline articulation of metathoracic trochanter and femur, x 30.
- G. *Pselaphus justifer* Casey, macrosceline articulation of metathoracic trochanter and femur, X 30.

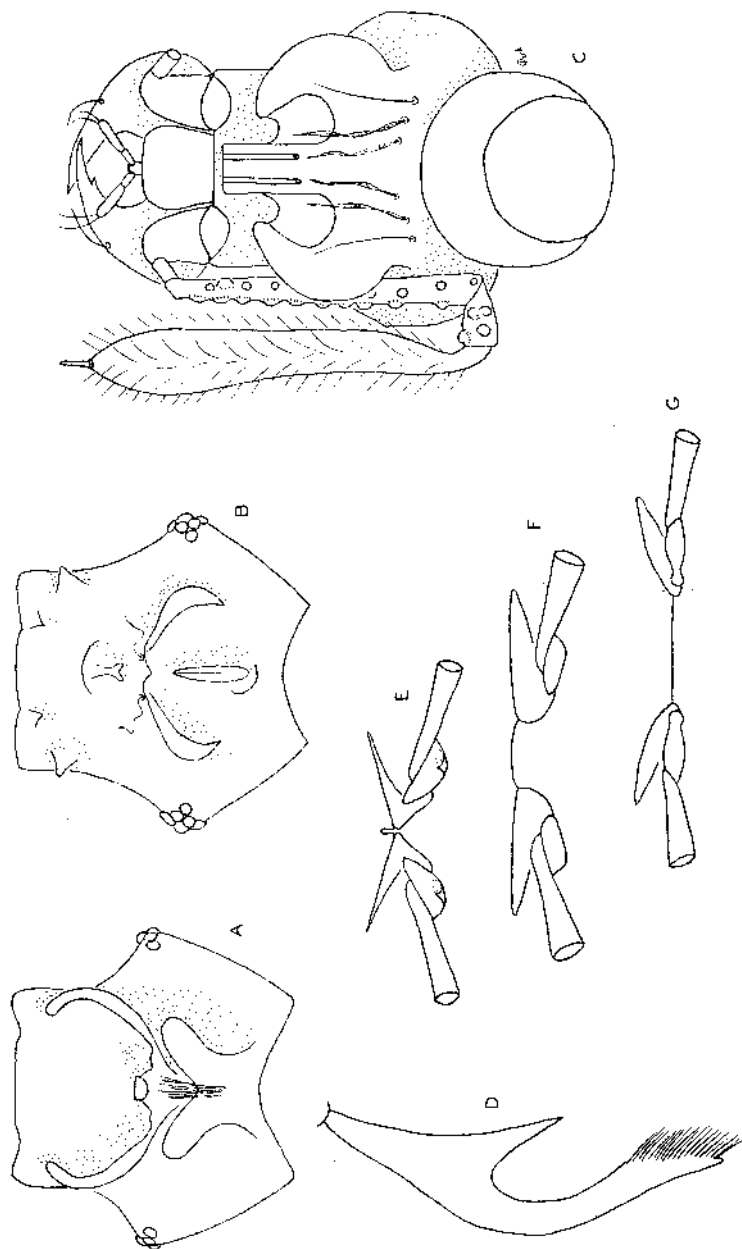


PLATE 3

A. Speleobama vana Park, aedeagus, x 70 (after Park, 1951).

B. Prespelea quirsfeldi new genus and new species, aedeagus, X 430.

0.44 mm. long, 0.21 mm. wide.

C. Pselaptrichus rothi new species, aedeagus, x 430. 0.33 mm. long, 0.33 mm. wide.

D. Machaerites (Speleochus) stygius Park, aedeagus, x 430. 0.53 mm. long, 0.23 mm. wide, 0.17 mm. deep.

Note: The internal sac is exerted in A and D, and is withdrawn in B and C. The symbol 0 marks the same morphological area in all four aedeagi, e.g., the right posterior angle of the median lobe.

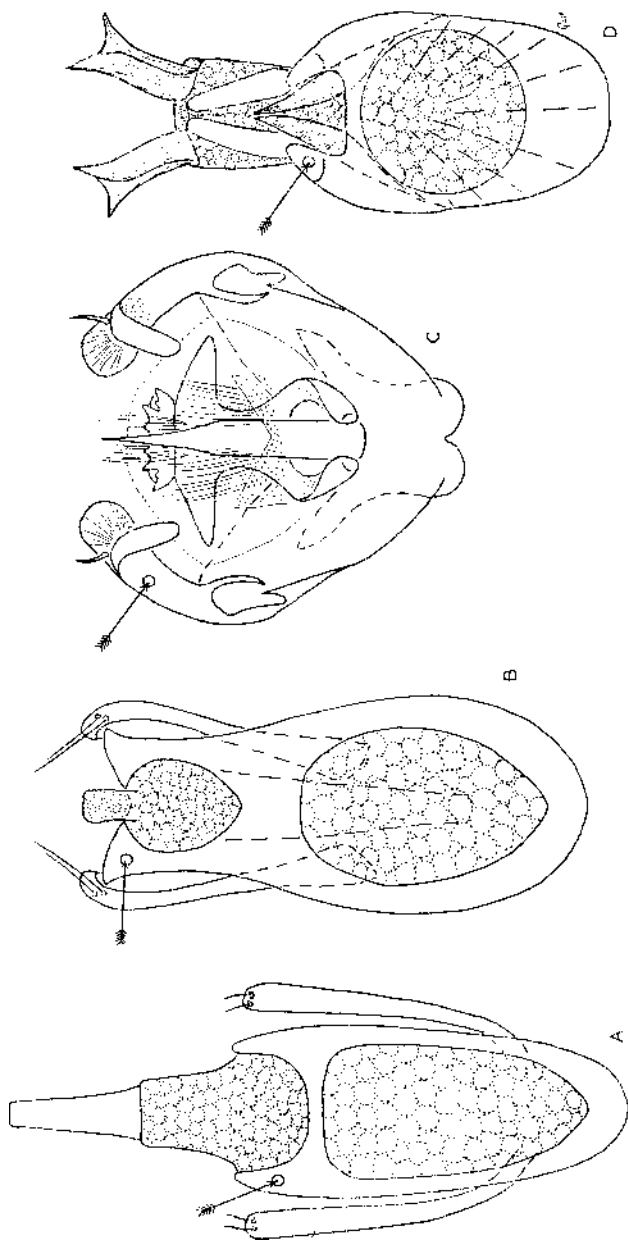


PLATE 4

- A. Speleobama vana* Park, dorsal aspect, X 70 (after Park, 1951).
B. Prespelea quirsfeldi new genus and new species, dorsal aspect, x 70.
C. P. quirsfeldi, brachysceline articulation of mesothoracic femur and trochanter, X 70.
D. Mipseltyrus nicolayi new genus and new species, left maxillary palpus, x 430.

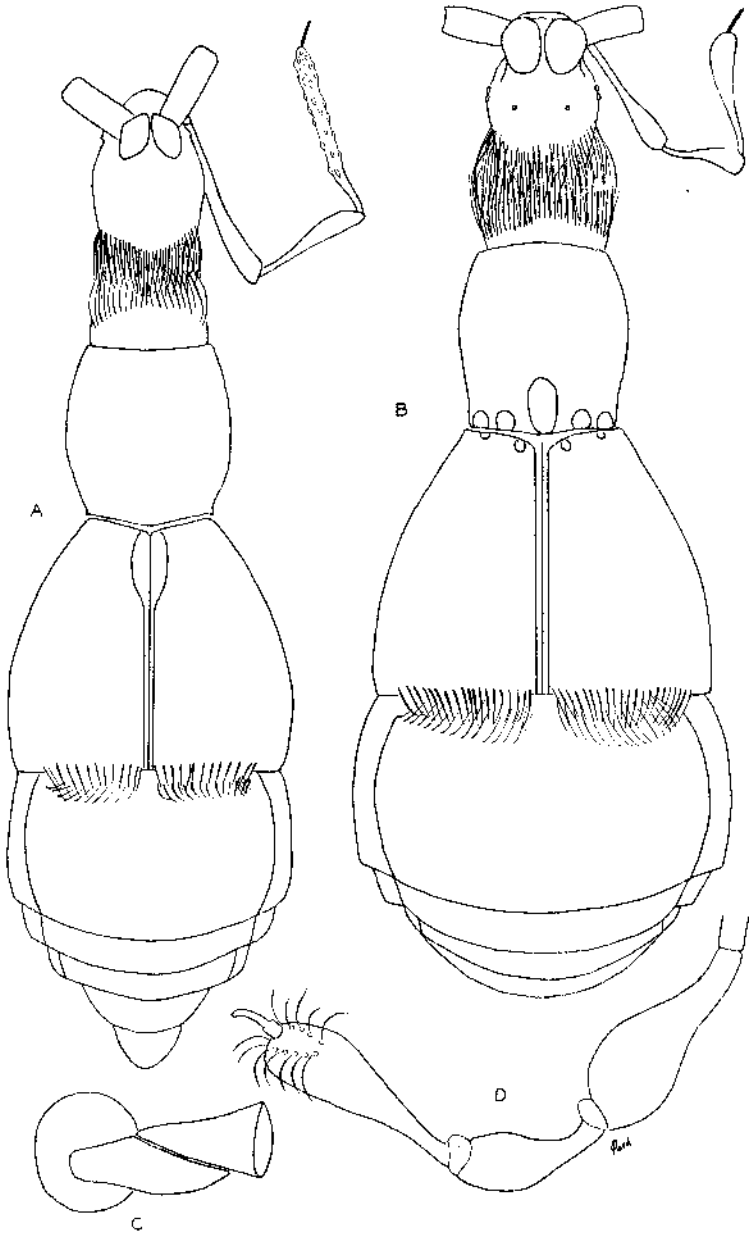


PLATE 5

- A. Mipseltyrus nicolayi* new genus and new species, aedeagus, dorsal aspect,
X 430.
- B. M. nicolayi*, aedeagus, ventral aspect, _x 430.
- C. M. nicolayi*, aedeagus, morphological right lateral aspect, X 430.
- D. M. nicolayi*, metatarsus, x 70.
- E. Macrosceline articulation of mesoleg, *Tmesiphornis costalis* LeConte, x 70.
- F. Macrosceline articulation of mesoleg, *Pselaphus fustifer* Casey, X 70.
- G. Brachysceline articulation of mesoleg, *Batrisodes ionae* (LeConte), x 70.
- H. Brachysceline articulation of mesoleg, *Reichenbachia gemmifer* LeConte, X 70.
- I. Prespelea quirsfeldi* new genus and new species, metatarsus, x 70. Note shape of third tarsomere.

Note: In figures E to H the stippled area represents that part of trochantal length covered by femur. For explanation see text.

